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HISTORY OF THE DEFENSE ATOMIC SUPPORT AGENCY (u)
1959 -- 1969
(Latter date denotes end of History compiled
by first DASA Historian)



Part 11
Headquarters

Chapter 8. Weapons Effects and Tests
Section 8-4. Medical

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John H. B. by S. 1 Mar 94



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SECTION 8-4.
OFFICE OF THE SURGEON
MEDICAL DIVISION

8-4. SURGEON,
MEDICAL DIVISION

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8-4. MEDICAL DIVISION

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MEDICAL DIVISION

1959

Organization, 1959

In the over-all organization of the Defense Atomic Support Agency, as in the organization of the Armed Forces Special Weapons Project, the Medical Division, under the Deputy Chief of Staff, Weapons Effects and Tests, was headed by the Surgeon for the agency as a whole. In this history the activities of both the Office of the Surgeon and the Medical Division will, in general, be included in this section under the Medical Division heading.

Under the Defense Atomic Support Agency (DASA) the Medical Division expanded. In addition to the Surgeon and Deputy Surgeon, two other officer billets were included in the Medical Division organization. One of these was the project officer for the reactor facility to be constructed at the Naval Medical Center.

Activities, 1959

1. Research Projects

During the year 1959 the Office of the Surgeon and the Medical Division monitored DASA-sponsored research programs at a number of institutions.

a. New York Medical College. A letter from the Armed Forces Special Weapons Project (AFSWP) to the Surgeon General, Department of the Army, on 15 January 1959, authorized increased funding in the amount of \$6,200 for the contract with the New York Medical College for research in

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toxic factors in thermal burns. These funds were to cover equipment necessary for the sponsored research. On 17 August 1959 an additional grant, in the amount of \$44,065, was made for this research.

b. Armed Forces Institute of Pathology. On 30 January 1959 funds in the amount of \$3,100 were obligated to this institution for a new research project entitled, "Cellular Identification of Radiation Effect."

c. Naval Material Laboratory. Funds in the amount of \$28,000 were authorized the Naval Material Laboratory, at the New York Naval Shipyard, for continuation of research on the thermal injury program. Again, on 31 July 1959, DASA agreed to furnish \$37,500 in research funds to support thermal radiation projects at the Naval Material Laboratory.

d. Medical College of Virginia. On 6 March 1959 funds in the amount of \$33,890 were obligated for continuation of research on toxemia in severe burns which was being carried on at the Medical College of Virginia. At this time, DASA concurred in the reorganization of the work which had been supported by AFSWP at the institution named above. Later, on 27 August 1959, DASA agreed to furnish \$7,940 in FY 1960 research funds for support of a project entitled, "Evaluation of Thermal Lesions of the Ocular Fundus in Rabbits and Man," to be carried on at the Medical College of Virginia.

e. University of Louisville. In the year 1957 research work entitled, "Electrical Properties of Normal and Abnormally Tanned Skin," had been initiated at the University of Louisville. With the transfer

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of the principal investigator in this project to the Medical College of Virginia in 1958, the work was moved to the Medical College of Virginia. In 1959, however, the work was continued at the University of Louisville. On 1 May 1959 funds in the amount of \$11,950 were obligated to the Surgeon General, Department of the Army, for this research.

f. Harvard Medical School. Funds in the amount of \$22,835 were obligated by DASA, on 4 May 1959, for continuation of work at the Harvard Medical School on, "Surgical and Burn Wound Infections of Hospitalized Patients."

g. Sloan-Kettering Institute for Cancer Research. It was agreed on 14 July 1959 that DASA would furnish the Surgeon General, Department of the Army, funds for fiscal year 1960 in the amount of \$13,740 in support of a research project on post-irradiation syndrome in humans. This research was to be done at the Sloan-Kettering Institute for Cancer Research.

h. Naval Radiological Defense Laboratory. By letter to the Chief, Bureau of Ships, dated 22 July 1959, DASA agreed to furnish \$70,000 in FY 1960 funds in support of research in the biological response to ionizing radiation. The investigation was to be carried on at the Naval Radiological Defense Laboratory.

i. School of Aviation Medicine. Fiscal year 1960 research funds in the amount of \$39,250 were authorized by DASA on 3 August 1959, for initiation of a project at the School of Aviation Medicine, at Brooks Air Force Base, Texas. The project was entitled, "Laboratory Investigation of the Production of Choriorretinal Injury and Protection Afforded

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by Photochromic Filters." Additional funds in the amount of \$25,000 were granted on 19 October 1959.

j. University of Rochester. On 27 August 1959 DASA agreed to furnish to the New York Operations Office of the AEC the amount of \$35,040 in research funds to support a project in clinical treatment of radiation injury. This was in continued support of a contract already made (in 1958) and of research already in progress.

k. Cornell University. DASA agreed, on 25 September 1959, to continue funding for research at Cornell University on tissue dosage and damage criteria for radiation exposure in large animals and for studies in metabolism and methods of reduction of body burdens of isotopes from fall-out. Fiscal year 1960 funds of \$90,000 were to be furnished for these studies.

l. Hahnemann Medical College. Continuation of support of research in the biochemical and endocrine disturbances following thermal stress, at Hahnemann Medical College, was agreed to by DASA on 19 October 1959.

m. University of Pennsylvania. On 2 November 1959, DASA agreed to fund, in the amount of \$14,700 for FY 1960, in support of a burn research project in progress at the University of Pennsylvania.

n. Walter Reed Army Medical Center. The whole-body radiation counter program being conducted at Walter Reed Army Medical Center continued to be supported by DASA. On 19 November 1960, FY 1960 funds were

1. History of AFSWP, Chapter 7, Section 4-4, pages 61 and 64; Section 4-4D, page 6.

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granted in the amount of \$30,500.

o. Lovelace Foundation. On 14 December 1959, DASA agreed, in a letter to the Atomic Energy Commission, to assume partial funding of the blast biology research being conducted by the Lovelace Foundation at Albuquerque, New Mexico. Funds totaling \$160,000 were to be furnished.

2. Other Activities of the Surgeon and Medical Branch

On 17 April 1959 the Surgeon gave a presentation before a class in Medico-Military Application for Nuclear Medical Officers, at the Walter Reed Army Institute of Research.

A conference to discuss the problem of retinal burns in connection with high altitude shots was arranged by the Surgeon and was held at AFSWP (DASA) headquarters on 5 May 1959. This conference was attended by representatives from the offices of the three Surgeons General; from Field Command, AFSWP; and from the Navy Material Laboratory, the Wright Air Development Center, and the Atomic Energy Commission.

The Surgeon and Deputy Surgeon were at Albuquerque, New Mexico, during the period 13 to 23 September 1959. They attended the Armed Forces Medical Symposium held at Sandia Base, 14-18 September. During the remainder of the period, conferences were held at Headquarters, Field Command; at Sandia Base Hospital; at Manzano Base; and at the Lovelace Foundation, a DASA research contractor.

On 17 August 1959 a conference on retinal burns was held at the Medical College of Virginia. It was attended by representatives of the various laboratories conducting research on retinal burns. Also in attendance were representatives of the Medical Division of Headquarters, DASA.

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During the period 29 September to 3 October 1959, Lieutenant Commander William H. Chapman, MSC, USN, was on temporary duty at the Atomic Division of General Dynamics Corporation, La Jolla, California. The purpose of this duty was to evaluate the latest technical developments and capabilities of the TRIGA reactor for the proposed biomedical reactor facility at the National Naval Medical Center, Bethesda, Maryland, to determine the type of construction required for housing the reactor facility, and to discuss problems peculiar to design for this specialized type of structure.*

Key Personnel, 1959

During the year 1959, in which the transition from AFSWP to DASA took place, there were some major changes in personnel in the Surgeon ---Medical Division organization. Lieutenant Colonel Sven A. Bach, MC, USA, was replaced as Surgeon and Chief of the Medical Division by Captain John A. O'Donoghue, MC, USN. The Medical Division was enlarged by the addition of two officers.

As of 31 December 1959 the key personnel were as follows:

Surgeon and Chief, Medical Division

Captain John A. O'Donoghue, MC, USN

Deputy Surgeon and Executive Officer

Captain Johnny M. Barton, MC, USAF

Project Officer, Reactor Facility

Lt. Commander William H. Chapman, MSC, USN

Lt. Commander Joseph S. Garrison III, MC, USN

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*See pages 6a and 6b.

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Armed Forces Radiobiology Research Institute

In August 1958 the Bureau of Medicine and Surgery, United States Navy, proposed to the Armed Forces Special Weapons Project (which organization became the Defense Atomic Support Agency on 6 May 1959) that a biomuclear facility, to be jointly sponsored by the Services, be established at the National Naval Medical Center (NNMC). Such a facility was described as a means of corroborating and extending results obtained from biomedical field tests, as well as a means of designing and performing experiments preliminary to field testing. The respective Offices of the Surgeons General of the Army and the Air Force expressed interest in the development of such a facility. Concurring in the proposal for its establishment were the Public Health Service, the Atomic Energy Commission, and Dr. Frank Berry, then Assistant Secretary of Defense (Health and Medical).

In October 1959 the Deputy Secretary of Defense stated that the Director of Defense Research and Engineering had recommended support of a DASA proposal for a biomedical research reactor, to be located at the National Naval Medical Center, Bethesda, Maryland. DASA proceeded with plans for the research institute.

The TRIGA nuclear reactor, developed by the General Atomic Division, General Dynamics Corporation, was found to fulfill most of the criteria for a primary radiation source. A 30-Mev electron accelerator was added to the original plans, as a second major radiation source. Plans also included provisions for the future addition of positive ion accelerators to expand the potential of

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the radiation source complex.

The Board of Governors of the Armed Forces Radiobiology Research Institute (AFRRI) was to be composed of the respective Surgeons General of the three Armed Services and the Chief, Defense Atomic Support Agency.

Organization

The Office of the Surgeon, DASA, and the Medical Division continued to grow during the year 1960. This was for the most part a result of the Reactor Program which was in the process of development. More about this program will be brought out in the paragraphs concerning the activities of the Office and Division.

1960
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Activities, 1960

1. Research Projects

DASA-sponsored biomedical research programs continued during the year 1960 at the institutions named in the sub-paragraphs which follow.

a. National Naval Medical Center. Early in the year 1958 the Armed Forces Special Weapons Project granted funds to the National Naval Medical Center in support of a research project entitled, "Application of Cell-Free Spleen Extracts and Their Therapeutic Value for Radiation Sickness."² On 2 March 1960, DASA agreed to furnish funds in the amount of \$30,880 for fiscal year 1961, in continued support of this project. In spite of the fact that there had not been very much progress made toward the goal of this research, it was decided to continue its support for at least one more fiscal year, with the hopes that a break-through might be made toward the development of a post-exposure

2. History of AFSWP, Chapter 7, Section 7-4D, page 4.

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radiation treatment. Later, on 13 April 1960, there was obligated to the National Naval Medical Center the amount of \$66,550 for the continued support of an investigation on the measurement of the ionizing radiation dose received at various depths in biological tissue.³ Also in the same month, on 26 April 1960, funds in the amount of \$60,700 were obligated to the National Naval Medical Center for the investigation of the pathological and biochemical effects of ionizing radiation.

b. Harvard University. By a DASA letter dated 7 March 1960, DASA support of research being carried on at Harvard University was discontinued.⁴

c. Medical College of Virginia. Funds in the amount of \$79,395 were obligated to the Medical College of Virginia on 6 April 1960 for research entitled, "Studies of Factors Responsible for Thermal Injury." Similar research was being carried on at the New York Medical College and at the Naval Medical Field Research Laboratory. On 21 April 1960, funds in the amount of \$27,500 were transferred from the research project entitled, "Medical Aspects of Ionizing Radiation," to the one entitled, "Medical Aspects of Thermal Radiation," for additional research at the Medical College of Virginia. In support of another research project at the same institution, DASA obligated, as of 29 April 1960, funds in the amount of \$43,090 for, "A Study of Chorioretinal Burns in Man and Rabbit."⁵

1. Ibid.

4. This section, page 3 .

5. This section, page 2 .

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d. Lockheed Aircraft Corporation. In May 1960, funds in the amount of \$10,245 were made available for the support of a Lockheed Aircraft Corporation research project entitled, "Proposal for Study of Choriorretinal Absorption as a Factor in the Production of Retinal Burns."

e. University of Louisville. On 1 June 1960, NASA agreed to furnish FY 1960 funds in the amount of \$4,400 for the completion of the research on the electrical properties of normal and thermally injured skin at the University of Louisville.⁶

f. Bureau of Medicine and Surgery, Department of the Navy. NASA agreed, on 29 June 1960, to furnish the Bureau of Medicine and Surgery the amount of \$400,000 in FY 1960 funds for the operational maintenance of the Biomedical Radiation Research Facility.

g. Walter Reed Army Medical Center. On 4 August 1960 funds in the amount of \$29,400 were obligated to the Walter Reed Army Medical Center for continued research in the project entitled, "Assessing the Behavioral Effects of Ionizing Radiation." On 12 September 1960, there was obligated the amount of \$35,575 for continued research on the project entitled, "Studies of Irradiation in Dogs, Determination of Fission Products in Biological Specimens, and Follow-up Studies of Operation PLUMBOB."⁷

h. Naval Radiological Defense Laboratory. Funds in the amount of \$310,000 were obligated on 19 August 1960 for continued support of

6. This section, page 2 .

7. This section, page 4 .

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research entitled, "Hazard Evaluation of Critical Organ Systems" and "Hazard Evaluation through the Use of Parameters of Critical Organ Function and Performance and the Correlation of Recovery from Radiation Injury in Multiple Mammalian Species."

i. Naval Material Laboratory. Funds in the amount of \$50,000 were transferred to the Naval Material Laboratory on 1 September 1960 for continued support of the thermal injury studies being conducted at the laboratory.

j. University of Rochester. The research in clinical treatment of radiation injury being done at the University of Rochester received continued support from DASA in the amount of \$84,000.

k. Cornell University. The research project at Cornell University entitled, "Biomedical Dosimetry and Response to Internal and External Radiation, received additional support of \$102,500 on 6 September 1960.

l. University of Pennsylvania. On 6 September 1960, the amount of \$11,565 was obligated to the University of Pennsylvania for continued research on the effects of heating the skin and subcutaneous tissues by microwave radiation.

m. Armed Forces Institute of Pathology. On 8 September 1960 the Armed Forces Institute of Pathology was awarded \$33,425 for study of the response of massive suspension cultures of mammalian cells to acute radiation.

n. Naval Medical Field Research Laboratory. Funds in the amount of \$58,550 were obligated to the Naval Medical Field Research

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Laboratory on 22 October 1960 in support of a research project entitled, "Diagnosis, Prevention and Emergency Care of Acute Radiation Sickness."

c. Columbia University. On 21 December 1960 a contract in the amount of \$53,125 was authorized with Columbia University for research on toxic factors in thermal burns.

d. Maharaja Medical College. The research at Maharaja Medical College on the biochemical effects of thermal stress was continued with a contract authorized on 27 December 1960 in the amount of \$19,500.

2. Armed Forces Radiobiology Research Institute (AFRRI)

A meeting of official representatives of the respective offices of the Surgeons General of the three Services and of the National Institutes of Health was held on 30 September 1960. An initial draft of the charter for the Armed Forces Radiobiology Research Institute (AFRRI) was agreed on by this working group. At a second meeting of the group, on 3 October 1960, a second draft of the charter was prepared.

In the meantime, the first meeting of the Radiation Research Committee, appointed for the purpose of coordinating the organizational details of the reactor facility to be constructed at the National Naval Medical Center, was held at DASA headquarters on 23 September 1960.

The first meeting of the Ad Hoc Scientific Advisory Committee for the AFRRI convened at DASA headquarters on 22 October 1960. This committee consisted of the following members:

Dr. G. Failla, Argonne National Laboratory

Dr. Charles L. Dunham, USAEC

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Dr. Lee Farr, Brookhaven National Laboratory

Dr. R. A. Kern, Temple University Hospital

Dr. Joseph Smadel, National Institutes of Health

Dr. L. Taylor, National Bureau of Standards

Dr. Shields Warren, New England Deaconess Hospital

A construction permit for the reactor to be built for the Armed Forces Radiobiology Research Institute (AFRRI) was issued by the Atomic Energy Commission on 8 November 1960. The safety performance of the TRIGA Mark F was approved by the Advisory Committee on Reactor Safeguards, AEC.

On 29 November 1960 a ground-breaking ceremony for the construction of the AFRRI reactor facility was held at the National Naval Medical Center, Bethesda, Maryland.

On 2 December 1960 a final draft of the charter for the Armed Forces Radiobiology Research Institute (AFRRI) was completed and was approved by the three Surgeons General and by DASA.

8

3. Biomedical Panel, Weapons Effects Board

Captain John A. O'Donoghue, USN, the Chief of the Medical Division, served as chairman of the Biomedical Panel of the Weapons Effects Board. This panel had three subpanels, namely, the Radiation Response Subpanel, the Thermal Subpanel, and the Blast Biology Subpanel, each of which met during August 1960. On 6 September 1960 the Biomedical Panel met at DASA headquarters. At this meeting the reports of the three

3. This chapter, Section 3-1, page 6.

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subpanels were given and a combined program for biomedical research in the field of nuclear weapons effects was prepared for forwarding to the WEB Steering Group.

4. Publications and Reports

The biomedical portion of the handbook, "Effects of Nuclear Weapons," was revised during the latter half of the year 1960. This was the contribution of the Medical Division toward the over-all revision of the handbook which was under the editorship of Dr. Samuel⁹ Glasstone.

Late in the year work was begun on a new medical chapter to be included in the revision of, "The Capabilities of Atomic Weapons"¹⁰ (TM 23-200).

Work was also done on a contribution to a revision of "The Medical Officers Handbook" (DA 8-11).

Key Personnel, 1960

Lieutenant Commander Joseph S. Garrison III, MC, USN, left the Division on change of station in August 1960. Those who reported into the Division during the year were Colonel Robert H. Holmes, MC, USA; Lieutenant Colonel Max M. Nold, VC, USAF; and Lieutenant Commander Robert Sharp, M-SC, USN. The latter was transferred from the Radiation Division.

9. This chapter, Section 8-1, pages 6 and 7.

10. Ibid., page 9.

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As of 31 December 1960 the key personnel of the Office of the Surgeon and the Medical Division were as follows:

Surgeon and Chief, Medical Division

Captain John A. O'Donoghue, MC, USN

Deputy Surgeon and Chief, Reactor Task Force

Colonel Robert H. Holmes, MC, USA

Deputy Surgeon and Executive Officer, Medical Division

Captain Johnny M. Berton, MC, USAF

Special Project Officer, Medical Division

Lt. Colonel Max M. Nold, VC, USAF

Special Project Officers, Reactor Task Force

Lt. Commander William H. Chapman, MSC, USN

Lt. Commander Robert Sharp, MSC, USN

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- 1961 -

Organization

The organization of the Office of the Surgeon and the Medical Division remained unchanged during the year 1961 except for personnel changes.

Activities, 1961

1. Research Projects

a. University of Cincinnati. On 12 January 1961 the amount of \$29,865 was obligated for research at the University of Cincinnati on a project entitled, "Metabolic Changes in Humans Following Total Body Irradiation."

b. Sloan-Kettering Institute for Cancer Research. Renewal of a contract with the Sloan-Kettering Institute was authorized on 13 January 1961 at a cost of \$39,410. This contract was in continued support of studies concerning the post-irradiation syndrome in man.¹¹

c. Baylor University. Authorization for continuation of research at Baylor University was made on 13 January 1961, in the amount of \$62,590. This was in support of research on the effect of total body irradiation on immunologic tolerance of bone marrow and hemopoietic of other living tissue.¹²

d. National Naval Medical Center. A research contract in the amount of \$5,275 was awarded to the National Naval Medical Center on 25

11. This section, page 3.

12. History of AFM/P, Chapter II, Part 1, 1961, page 2.

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January 1961. This was a contract for a study on the injection of bone marrow as an agent in alleviation of the effects of high doses of ionizing radiation in clinical treatment of leukemia.

e. David Taylor Model Basin. Funds in the amount of \$100,000 were advanced to the David Taylor Model Basin on 9 May 1961 for research entitled, "Underwater Shock Effects Tests Series Ib Against USS FULLAM (DD 474); Personnel Protection Project Test Plan." Data from this research was expected to be useful to the Blast and Shock Division as well as to the Medical Division.

f. Medical College of Virginia. Authorization was made on 10 May 1961 for a contract in the amount of \$50,000 with the Medical College of Virginia for research entitled, "Immunological Factors in Burns." Later, on 22 June 1961, a contract was authorized with the Medical College of Virginia for research entitled, "A Study of Chorio-¹³retinal Burns in Man and Rabbit." This research, which was expected to cost approximately \$62,000, would produce valuable data as a basis for other research in retinal burns.

g. Naval Radiological Defense Laboratory. On 10 May 1961 funds in the amount of \$50,000 were advanced for continuation of DASA-¹⁴sponsored research at the Naval Radiological Defense Laboratory.

h. Armed Forces Institute of Pathology. Funds in the amount of \$35,000 were advanced to the Armed Forces Institute of Pathology on 5 June 1961 for investigation concerning the response of massive sus-

13. This section, pages 2 and 3.

14. Ibid., page 9.

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pensions of mammalian cells to acute radiation.

i. National Naval Medical Center. On 6 June 1961 funds in the amount of \$25,000 were advanced to the National Naval Medical Center for its research concerning cell-free spleen extracts and their therapeutic value in radiation sickness.¹⁵ It was anticipated that this research would be completed in the near future and that a final progress report would be made.

j. Cornell University. On 22 September 1961 a contract modification was authorized for the research project at Cornell University entitled, "Biomedical Dosimetry and Response to Internal and External Radiation."¹⁶ The additional support was in the amount of \$72,760.

k. John B. Pierce Foundation. A contract modification in the amount of \$5,000 was authorized in support of research by Dr. James D. Hardy at the John B. Pierce Foundation. This research on physiological response to burns had been supported previously at the University of Pennsylvania.

l. Hahnemann Medical College. On 2 November 1961 a contract was authorized for support of a research project at Hahnemann Medical College on protective agents for burns. A total of \$5,000 in FY 1962 funds was furnished for this project.

m. University of Rochester. On 6 November 1961 the New York Operations Office, AEC, was notified that DASA would continue to support

15. This section, page 7.

16. Ebid., page 10.

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a research project entitled, "Combined Irradiation Project, Including Partial Body Radiation Effect, Physiological Effects of Radiation, and Effects of Combined Injury." Fiscal Year 1962 funds in the amount of \$35,000 were furnished for this research at the University of Rochester.¹⁷

n. Columbia University. Authorization was made on 7 November 1961 for a modification of the contract to support a project at Columbia University entitled, "Research Study of the Toxic Factors in Thermal Burns."¹⁸ The contract modification was for the added amount of \$50,000.

2. Armed Forces Radiobiology Research Institute

Representatives of the Atomic Division of General Dynamics Corporation, La Jolla, California, (spoken of as "General Atomic"), the supplier of the DASA-TRIGA Mark F Reactor, met with the DASA Reactor Task Force at DASA headquarters on 8 February 1961. The purpose of this meeting was to discuss the extent and content of the training program required to qualify the reactor operators and other key personnel in accordance with the policy of the Atomic Energy Commission. Other such meetings were held, as necessary.

On 30 March 1961, at a meeting of the Board of Governors for the Armed Forces Radiobiology Research Institute (AFRRI) the following officers were named for the AFRRI: Colonel James T. Brennan, MC, USA, to be Director; Captain Francis W. Chambers, Jr., MSC, USN, and Lieutenant Colonel Carl L. Hansen, MC, USAF, as Deputy Directors.

A joint table of distribution which was approved by the Secretary

17. This section, pages 4 and 10.

18. Ibid., page 11.

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of Defense on 1 August 1961 provided for a total of 24 officers for the AFERI, eight from each of the three services. It provided for 17 enlisted men and for 67 civilians. By the end of the year 1961 all officer positions, with the exception of one, had been filled, approximately one-half of the enlisted men had been assigned, and several civilian secretarial positions had been filled. The current plan was to assemble the civilian staff over a period of three years.

The AFERI training program was inaugurated at La Jolla, California, on 26 June 1961. Phase I of the training program for the officers was to qualify them for AEC licenses as reactor operators. The project officers were joined by the director, deputy directors, and laboratory chiefs for Phase II of the training program at La Jolla in September 1961. All officers returned to Bethesda, where Phase III of the training program was initiated.

On 23 March 1961, DASA authorization was given for the training program of the AFERI. As planned, it was estimated that this program would cost \$184,800. On 29 November 1961 an initial transfer of \$100,000 was made to the National Naval Medical Center for the beginning of funding for research at the Armed Forces Radiobiological Research Institute.

Following ground breaking for the reactor facility, freezing weather and an accumulation of snow hampered construction efforts throughout January and until mid-February. The tank for the TRIGA reactor was delivered on 15 February 1961 and was permanently installed on 12 March 1961. By 30 June the outside shell and the roof of the facility had been completed. By the end of the year 1961 the administrative area and parts

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of the laboratory area had been completed and were occupied.

In the meantime, planning of the long-range research program for the AFRRI was continued, with emphasis on the preparation of equipment requirements and the procurement of equipment. The steering group of the Weapons Effects Board recommended a research budget of \$600,000 for the AFRRI for fiscal year 1962.

3. Biomedical Panel, Weapons Effects Board

The Biomedical Panel of the Weapons Effects Board met at DASA headquarters on 12, 13, and 20 July 1961 to review proposals for work in nuclear weapons effects biomedical research in fiscal year 1963, as submitted by the Services and by laboratories. A recommended budget was prepared for presentation to the Weapons Effects Board.

Captain O'Donoghue, USN, Chief of the Medical Division, continued to serve as chairman of the Biomedical Panel. Subpanel chairmen were as follows:

Subpanel on Blast and Shock - Colonel Robert H. Holmes, MC, USA

Subpanel on Radiation Response - Lt. Colonel Max M. Nold, VC, USAF

Subpanel on Thermal Radiation - Lt. Commander Clinton J. McGrew, Jr., MC, USN

The primary activity of the Biomedical Panel was the development of the FY 1963 program for presentation to the Steering Group of the Weapons Effects Board.

4. Other Activities

The Surgeon, DASA, and one of the Deputy Surgeons participated in the US-UK Conference on Storage Criteria for Plutonium-Bearing Weapons which met at DASA headquarters 28-30 June 1961.

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1 Lt. Colonel Nold, VC, USAF, was a member of a working group which met at the National Bureau of Standards in January 1961 to consider the use of livestock in national damage assessment planning. In April 1961, Lt. Colonel Nold participated in a meeting which was concerned with radiation damage to livestock. This meeting, which was held in Chicago, was sponsored jointly by the National Academy of Sciences and the National Research Council.

A meeting on retinal burn threshold studies was held at DASA headquarters on 13 October 1961. It was attended by a number of people engaged in research in eye burns. On 20 October, at DASA headquarters, a conference on retinal burn studies and biomedical testing was attended by representatives of the Atomic Energy Commission, the Armed Forces Institute of Pathology, the National Naval Medical Center, and the Defense Atomic Support Agency.

5. Publications.

A final revision of the biomedical portion of the handbook, "Effects of Nuclear Weapons," was done in March, April, and May 1961 and was coordinated with appropriate offices of the Atomic Energy Commission. The revised version was forwarded to Dr. Glasstone for editing.

Further revision of the draft of "The Medical Officer's Handbook" was done, following review by and comments of the Services.

Work continued on the revision of the medical chapter of TM 23-200, "The Capabilities of Atomic Weapons".

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Key Personnel, 1961

Officers who reported for duty during the year 1961 were Lieutenant Colonel William S. Mullins, MSC, USA, and Lieutenant Clinton J. McGrew, Jr., MC, USN.

Officers who left the organization during the year were Lieutenant Commander Robert Sharp, MSC, USN, and Captain Johnny M. Barton, MC, USAF. The latter resigned from service.

As of 31 December 1961, key personnel of the Office of the Surgeon and the Medical Division were as follows:

Surgeon and Chief, Medical Division

Captain John A. O'Donoghue, MC, USN

Deputy Surgeon and Chief, Reactor Task Force

Colonel Robert H. Holmes, MC, USA

Deputy Surgeon and Special Projects Officer

Lt. Commander Clinton J. McGrew, Jr., MC, USN

Special Project Officer, Medical Division

Lt. Colonel Max M. Nold, VC, USAF

Special Project Officer, Reactor Task Force

Commander William H. Chapman, MSC, USN

Administrative Officer, Medical Division

Lt. Colonel William S. Mullins, MSC, USA

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- 1962 -

Organization

The organization and functions of the Medical Division remained unchanged during the year 1962.

Activities, 1962

1. Research Projects

a. University of Cincinnati. The contract with the University of Cincinnati for a research project done by that institution on "Metabolic Changes in Humans Following Total Body Irradiation" was renewed early in 1962. Fiscal year 1962 funds were provided in the amount of \$38,000.

b. Sloan-Kettering Institute for Cancer Research. A DASA-sponsored contract with the Sloan-Kettering Institute for a project entitled "Medical Aspects of Ionizing Radiation Effects of Total or Partial Body Irradiation," was renewed. Fiscal year 1962 funds were provided in the amount of \$40,482.

c. Baylor University. The contract with Baylor University College of Medicine for research on a project entitled "The Effect of Total Body Irradiation on Immunologic Tolerance of Bone Marrow and Homografts of Other Living Tissue" was extended. Fiscal year 1962 funds in the amount of \$62,000 were provided for the extended contract.

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d. New York University Medical Center. During the first half of the year 1962 a contract was negotiated with New York University Medical Center for a research project entitled "Suppression of Iodine-131 Uptake in Humans."

e. Medical College of Virginia. Two nuclear weapons effects research (NWER) contracts with the Medical College of the University of Virginia were extended during the latter half of 1962. A total of \$15,000 of fiscal year 1963 NWER funds were provided for the continuation of a project entitled "Choriorretinal Burn in Man and Rabbit." Fiscal year 1963 funds in the amount of \$77,000 were provided in support of continued research on toxic products produced in burned tissue.

f. Hahnemann Medical College. A contract with the Hahnemann Medical College for research on burn toxicology was extended. Funds in the amount of \$25,000 were set aside for this project from fiscal year 1963 funds.

g. University of Rochester. On 27 September 1962 the New York Operations Office, AEC, was notified that DASA would furnish \$50,000 in fiscal year 1963 funds in support of research at the University of Rochester. The project supported there was entitled "Combined Irradiation Project, Including Partial Body Radiation Effect, Physiological Effects of Radiation, and Effects of Combined Injury."

h. Lovelace Foundation. A contract with the Lovelace Foundation for research entitled "Mechanism of Blast and Shock

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Injury" was continued. DASA furnished fiscal year 1963 funds in the amount of \$350,000 in support of this project.

1. Armed Forces Institute of Pathology. On 28 September 1962, the Director, Armed Forces Institute of Pathology, was notified that \$15,000 in fiscal year 1963 funds would be furnished to support a DASA-sponsored research project entitled "Immediate Ultramicroscopic Radiation Changes in Lymphocytes of the Intestinal Wall."

j. Naval Medical Field Research Laboratory. On 29 November 1962 the Commanding Officer, Naval Medical Field Research Laboratory, was notified that DASA would furnish \$30,000 in fiscal year 1963 funds in continuance of support of a research project entitled "Dums, Preventive and Emergency Care of Amphibious Troops."

2. Participation in Weapons Effects Tests

The Medical Division participated in Operation DOMINIC by sponsoring nuclear weapons effects tests (NWET) projects in eye burns and eye protective devices. Some officers from the Division were placed on temporary duty with Joint Task Force Eight during the Operation.

3. Armed Forces Radiobiology Research Institute

The Department of Defense issued a directive which formally established the Armed Forces Radiobiological Research Institute (AFRRI).¹⁹ The following paragraphs are quoted from the directive.

19. DOD Directive, 12 May 1961, "Armed Forces Radiobiology Research Institute."

a. The Institute shall serve primarily as radiobiology research laboratories for the Department of Defense. The National Institutes of Health, Atomic Energy Commission, and other federal and civilian institutions may utilize the laboratories as agreed upon by the Secretary of Defense or his designee.

b. The mission of the Institute shall be to conduct scientific research in the field of radiobiology and related matters that are essential to the support of the United States military services, to national welfare, and to the well-being of mankind.

c. Under Department of Defense policies, the Institute shall:

- (1) Provide facilities for research on the biological effects of ionizing radiation.
- (2) Conduct advanced training and educational programs.
- (3) Provide facilities for radioisotope production.
- (4) Perform such other functions as may be assigned.

On 31 July 1962 the Secretary of the Navy directed that the AFRRI mission would be accomplished through the combined and coordinated efforts of the three Services, with military command vested in the Commanding Officer, National Naval Medical Center, and that the management control would be provided by the Bureau of Medicine and Surgery, United States Navy.²⁰

Limited occupancy of the AFRRI facilities was begun on 2 January 1962, while access to the entire laboratory building was obtained on a beneficial occupancy agreement on 8 January 1962.

20. SECNAV Notice 5450, 31 Jul 1961.

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Further occupancy was obtained as construction proceeded. The Phase I Laboratory and Reactor buildings were formally accepted from the contractor on 1 August 1962. The Animal Clinical Research Facility was accepted on 19 September 1962.

Early in 1962, plans were begun for Phase II construction for the Armed Forces Radiobiology Research Institute (AFRRI). These plans for 14,000 additional square feet in the Laboratory Building and 7,500 additional square feet in the Animal Clinical Research Facility were presented to DASA in April 1962. Phase II construction funding was authorized by Congress and was approved by the President on 28 September 1962. Architectural plans and engineering designs for Phase II construction were almost complete as of the end of the year 1962.

Key Personnel, 1962

Officers who reported to the Medical Division during the year 1962 were: Lieutenant Commander Richard M. Garver, MSC, USN; Major de Paul J. Corkhill, VC, USAF; and Lieutenant Commander Thomas S. Dunn, Jr., MC, USN.

Officers who left the Division were Captain John A. O'Donoghue, MC, USN; Commander William H. Chapman, USN; and Lieutenant Commander Clinton J. McGrew, Jr., USN.

As of 31 December 1962, personnel of the Medical Division were organized as follows:

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Surgeon and Chief, Medical Division

Colonel Robert H. Holmes, MC, USA

Deputy Surgeon

Lt. Commander Thomas S. Dunn, Jr., MC, USN

Senior Project Officer

Lt. Colonel Max M. Nold, VC, USA

Project Officers

Lt. Colonel William S. Mullins, MSC, USA

Lt. Commander Richard M. Garver, MSC, USN

Major de Paul J. Corkhill, VC, USAF

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- 1963 -

Redesignation

The Medical Division was redesignated the Biomedical Division,
as of 27 February 1963.²¹

Functions

The functions prescribed for the Biomedical Division during
the year 1963 were as follows:

1. Acts in a consultative capacity to individuals and organizations within DASA, the Department of Defense, the Military Services and other agencies, branches and instruments of the United States Government. May have representation on various bodies for this purpose.
2. Coordinates testing laboratory and theoretical programs for the investigation of the biomedical effects of nuclear weapons, and makes appropriate recommendations for the Chief, DASA, to submit to the Services and DDR&E, maintaining liaison with appropriate Governmental agencies.
3. Prepares reports, analyses and evaluations of the results of tests and laboratory investigations; provides within the DOD the central agency for the collection and dissemination of technical information as to biomedical effects and safety of atomic weapons relating to research by the AEC; and maintains current information as to the status of military research in biomedical aspects of atomic weapons.
4. Supervises conduct of medical aspects of full-scale Department of Defense weapons effects tests by obtaining the requirements within the DOD, preparing in coordination with the Services, full-scale weapons effects test programs for submission to the Joint Chiefs of Staff,

1963

21. General Order Number 2, Hq., DASA, 27 February 1963.

assisting in the preliminary plans for the military phases of such tests, and recommending budgetary inclusion of those items not normally in the Services' budgets.

5. Coordinates with Training Division in the training of Medical and Paramedical Officers of the Armed Forces in effects of nuclear weapons and radiation biology.

6. Provides technical information and advice concerning medical aspects of storage site operation.

7. Coordinates in those activities of the Deputy Chief of Staff, Research and Development, DASA, dealing with safety handling criteria.

8. Coordinates in the activities of the Joint Nuclear Accident Coordinating Center, to advise in the medical aspects of radiological incidents.

9. Prepares budget estimates and reports.

10. Acts as Medical Representative of DASA on meetings concerning effects research programs, chairs the appropriate meetings, and provides administrative assistance when needed.

11. Acts for Chief, DASA, on matters pertaining to the establishment, construction, training and operation of, and research conducted by the Armed Forces Radiobiology Research Institute (AFRRI).

12. Chief, Biomedical Division, serves as the Defense Atomic Support Agency Surgeon.

13. Establishes regulations and procedures at the DASA bases under the unified commands, resolves discrepancies and endorses reports, etc., for these bases.

14. Provides the Secretary of the Nuclear Safety Working Group, of the Joint Board on Future Storage, which is chaired by one of the Deputy Chiefs, DASA. The Secretary acts as the principal staff officer for coordination within Headquarters, DASA, on all matters relating to atomic weapons nuclear safety, to include proper designation of action agencies and to insure that appropriate coordination has been effected prior to transmission on Headquarters, DASA, originated correspondence. The Secretary will also act as DASA consultant to the Armed Services Explosive Safety Board.²²

22. DASA Organization and Functions, as of 1 October 1963.

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Organization, 1963

With the exception of changes in incumbent personnel the organization of the Biomedical Division remained basically unchanged from that of the Medical Division, as it was previously designated.

Activities, 1963

1. Research Projects

a. University of Cincinnati. On 8 March 1963 the DASA Contract Management Branch was requested to negotiate a contract modification with the University of Cincinnati, whose College of Medicine continued research on "Metabolic Changes in Humans Following Total Body Irradiation." The estimated cost of the contract modification was \$40,160.

b. Sloan-Kettering Institute for Cancer Research. At the end of the year 1963 the Sloan-Kettering Institute was informed that the contract supporting research entitled "Study of the Post-Irradiation Syndrome in Man" would be discontinued, effective 31 January 1964. In the meantime, in March 1963, a modification in the contract entitled "Medical Aspects of Ionizing Radiation-- Effects of Total or Partial Body Irradiation" was negotiated at an estimated cost of \$42,000.

c. Baylor University. A modification was negotiated on 17 April 1963 in the contract with Baylor University for research in "The Effects of Total Body Irradiation on Immunologic Tolerance of Bone Marrow and Homografts of Other Living Tissue." This change

extended the contract from 31 January 1963 to 31 January 1964 at an increase in cost of \$40,000. On 30 December 1963 a letter to Baylor University College of Medicine informed the institution that the contract would be discontinued as of 31 January 1964.

d. New York University. The contract with New York University Medical Center for research entitled "Research Study Relating to Suppression of Iodine-131 Uptake in Humans" was modified in February 1963. The estimated cost of the contract for a 24-month period beginning 1 January 1963 was \$100,000.

e. Medical College of Virginia. In December 1963 a modification was made in the contract with the Medical College of Virginia for research in "Immunological Factors in Burns." The cost involved was \$45,000 in Nuclear Weapons Effects Research (NWER) funds for fiscal year 1964.

f. University of Rochester. On 5 September 1963 the New York Operations Office, AEC, was notified that DASA would provide \$47,000 in fiscal year 1964 NWER funds in continued support of a research project at the University of Rochester entitled "Combined Irradiation Project, Including Partial Body Radiation Effect, Physiological Effects of Radiation, and Effects of Combined Injury."

g. Lovelace Foundation. In May 1963 a contract modification was made, authorizing the Lovelace Foundation to make translational studies at the Australian high-explosive blast experiment, Operation ²³BLow DOWN. This modification to the contract for

23. This chapter, Section 8-2, page 27.

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research in "Biological Effects of Blasts from Bombs" was at an additional cost of \$26,500, with funding to be provided by the U. S. Army Medical Research and Development Command. No additional DASA funds were required. However, in June 1963, DASA negotiated a modification to the contract with the Lovelace Foundation at an increased cost of \$25,000. Again, in August 1963 the contract was modified at an increase in cost of \$35,000 in NWER funds. In September, the contract with the Lovelace Foundation was modified in support of a research proposal entitled "Mechanism of Blast and Shock Injury." This was funded with \$48,000 in FY 1963 NWER funds and \$302,000 in fiscal year 1964 NWER funds.

h. Armed Forces Institute of Pathology. On 22 August 1963 the Director, Armed Forces Institute of Pathology, was notified that fiscal year 1964 NWER funds were being provided by DASA in continued support of research projects entitled "Immediate Ultramicroscopic Radiation Changes in Lymphocytes of the Intestinal Wall" and "Early Response of Mammalian Cells and Tissues to Acute Radiation."

i. John B. Pierce Foundation. In January 1963 a contract amendment was negotiated with the John B. Pierce Foundation to cover additional expenses incurred in a research project entitled "Research Study of Thermal Burns." A further modification, in June 1963, extended the contract period from 30 September 1963 to 30 September 1964, at a cost of \$12,480.

j. Bureau of Ships. Also in January 1963, funds allocated to the Bureau of Ships were increased in the amount of \$50,000. This

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amount was divided as follows: "Nuclear Warfare Aspects of Whole Body Ionizing Radiation, \$15,000; and "Radiological Casualty Evaluation," \$35,000.

k. Columbia University. Early in January 1963 a contract modification was negotiated with Columbia University in support of "Research Study of the Toxic Factors in Thermal Burns." The estimated cost of the contract modification was \$55,000.

l. Edgerton, Germeshausen, and Grier. In May 1963, steps were taken to negotiate a contract with Edgerton, Germeshausen, and Grier, Incorporated, to provide photographic coverage at Operation ²⁴ BLOW DOWN, the Australian high explosive (HE) blast experiment. The estimated cost of \$2,943 was funded by the United States Army Medical Research and Development Command. No DASA funds were involved. In August 1963, DASA entered into contract relations with Edgerton, Germeshausen, and Grier, Incorporated, in support of a research proposal entitled "Proposal for Research in Radiation Dosimetry." The estimated cost of this contract was \$78,500 in fiscal year 1963 NMER funds. Also in August, a contract was negotiated with the same company for a study entitled "Feasibility Study of a Mobile Laboratory for Evaluation of Nuclear Contamination." This contract was written in the amount of \$3,150 in fiscal year 1963 NMER funds.

24. Ibid.

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m. Aerospace Medical Research Laboratories. The Commanding Officer, 6570th Aerospace Medical Research Laboratories, Wright-Patterson Air Force Base, was informed on 18 June 1963 that a military interdepartmental purchase request (MIPR) in the amount of \$40,000 would be forwarded to provide partial funding of "Analysis and Consolidation of Thermal Data Emanating from Nuclear Weapons Effects Tests and Research."

n. USAF School of Aerospace Medicine. On 26 July 1963 the USAF School of Aerospace Medicine was notified that \$215,000 in fiscal year 1963 NWER funds would be furnished to provide for retinal burn instrumentation as part of a Test Instrumentation Development Program. In September 1963, arrangements were made through a military interdepartmental purchase request (MIPR) to transfer \$15,000 to the School of Aerospace Medicine for the production of a retinal burn film from Operation FISH BOWL.

o. Radiation Research Associates, Incorporated. In August 1963 a contract was negotiated with Radiation Research Associates, Incorporated, Fort Worth, Texas, in support of a research proposal entitled "Determination and Comparison of Radiation Fields." The estimated cost was \$19,824 in fiscal year 1963 NWER funds. In November the contract with Radiation Research Associates was modified to pay for the cost of additional computer time in the amount of \$1,700 from fiscal year 1963 NWER funds.

p. Minnesota Mining and Manufacturing Company. In August 1963 proceedings were begun to negotiate a contract with the Minnesota

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Mining and Manufacturing Company, St. Paul, Minnesota, in support of a study entitled "Fallout Analog Dynamics (FAD), a Proposal for Feasibility Study of Fallout Simulator Facility," at a cost of \$65,000 in fiscal year 1963 NWER funds.

q. Nuclear Utility Services, Incorporated. Negotiations were begun in August 1963 on a contract with Nuclear Utility Services, Incorporated, of Washington, D. C., for a study entitled "Design Study for a Broad Beam Exposure Port in FNER."^{*} The cost was \$39,956 in fiscal year 1963 NWER funds.

r. Naval Radiological Defense Laboratory. On 31 October 1963 the Commanding Officer and Director of the United States Naval Radiological Defense Laboratory was informed that funds previously furnished for the research in "Hazard Evaluation in Multiple Mammalian Species" were being increased by \$25,000 in fiscal year 1964 funds.²⁵

s. Cornell University. In November 1963 a contract with Cornell University for research concerning "Biomedical Dosimetry and Response to Internal and External Radiation" was modified to provide an additional amount of \$75,000.²⁶

t. Biodynamics, Incorporated. A contract was entered into, in June 1963, at an estimated cost of \$18,716, under which Biodynamics,

^{*}FNER - Fast Neutron Exposure Room.

25. This section, pages 9-10.

26. Ibid., page 17.

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Incorporated, Cambridge, Massachusetts, was to declassify a DASA Technical Report on Retinal Burns and Flashblindness.

u. Armed Forces Radiobiology Research Institute (AFRRI).²⁷

On 22 July 1963 proceedings were begun on the negotiation of a contract with the firm of Jerry B. Marion, Silver Springs, Maryland, for "Recommendations for the AFRRI Accelerator Facility." The estimated cost of this contract was \$4,820 in fiscal year 1963 NWER funds.

On 4 September 1963 the Commanding Officer, National Naval Medical Center, was informed that DASA would provide a total of \$943,000 in fiscal year 1964 funds for nuclear weapons effects research (NWER) in continued support of research at the Armed Forces Radiobiology Research Institute.

On 4 November 1963 the Director, AFRRI, was informed that \$200,000 of the fiscal year 1963 funds were being withdrawn for the purpose of funding a contract with General Atomic, a division of General Dynamics Corporation, San Diego, California, to provide technical services for the AFRRI. Subsequently, authorization was given to commit \$325,000 in fiscal year 1963 NWER funds in addition to a previously authorized sum of \$75,000 in fiscal year 1963 funds, for a contract for "Technical Support of AFRRI Activities."

27. Ibid., pages 6a-6b, 11-12, 18-20, and 25-27.

2. Liaison

Liaison was maintained with the following: Assistant Secretary of Defense (Health and Medical); the Surgeon General, Department of the Army; the Bureau of Medicine and Surgery, Department of the Navy; the Office of the Surgeon General, Department of the Air Force; Walter Reed Army Institute of Research; the National Naval Medical Center; the Air Force School of Aviation Medicine; the Division of Biology and Medicine, AEC; the Division of Operational Safety, AEC; the Director of Defense Research and Engineering; Armed Forces Institute of Pathology; Armed Forces Radiobiology Research Institute; Air Force Director of Advanced Technology; the Office of the Special Assistant to the President for Science and Technology; the Department of Health, Education, and Welfare; the Office of Civil Defense; and the Federal Aviation Council.

3. Weapons Effects and Tests Operations

During the year 1963 officers of the Biomedical Division participated in Operation ROLLER COASTER²⁸ and in Operation BLOW²⁹ DOWN. Members of the Division also took part in planning for Operations SNOW BALL,³⁰ FERRIS WHEEL,³¹ and BREN.³² The Division

28. This chapter, Section 8-1, pages 23-25 and 37-39.

29. This chapter, Section 8-2, pages 27-28.

30. Ibid., page 28.

31. This chapter, Section 8-1, page 32. Section 8-2, pages 36-37.

32. This chapter, Section 8-3, page 32.

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was represented at the FISH BOWL Review Symposium conducted at the Illinois Institute of Technology, Chicago, Illinois, 4 to 7 November 1963.

4. Conferences and Seminars

In April 1963, Colonel Holmes and Lieutenant Colonel Mullins took part in the Symposium on the Biological Effects of Blast and Shock, held at the headquarters of Field Command, DASA.

During the period 15-20 June 1963 Colonel Holmes, Lieutenant Colonel Mullins, and other officers of the Biomedical Division attended the annual meeting of the American Medical Association in Atlantic City, New Jersey. They displayed three DASA Biomedical Exhibits.

On 30 August 1963 a conference was held at DASA headquarters to discuss basic optimum physical parameters for test requirements.

On 17 September 1963, representatives of the respective offices of the three Surgeons General attended a meeting at DASA headquarters to discuss possible revisions or elimination of the DASA-sponsored annual Nuclear Weapons Medical Symposium. As a result of this meeting a Nuclear Weapons Medical Symposium Study Group was formed.

Captain Watters, Deputy Surgeon, DASA, attended a conference on "Nuclear Detonations and Marine Radioactivity" at the Norwegian Defense Research Establishment, Kjeller, Norway, 15-21 September 1963.

On 29 and 30 October 1963, at the request of the Surgeon General of the Navy, staff members of the Biomedical Division, with

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Captain Watters as project officer, conducted an unclassified lecture series entitled "Biological Nuclear Weapons Effects Briefings" as a portion of the ACLANT* Medical Officers Symposium, held at the Naval Medical Research Institute, National Naval Medical Center, Bethesda, Maryland.

Other meetings attended included a conference on retinal burns and flashblindness, at the School of Aerospace Medicine, Brooks AFB, Texas, 17-21 September 1963; the international symposium on biological effects of neutron radiation, at Brookhaven National Laboratory, Long Island, N. Y.; the fourteenth National County Medical Societies' Conference on Disaster Medical Care, sponsored by the Council on National Security, of the American Medical Association, at Chicago, 2 and 3 November 1963; and the Flashblindness Protection Management and Technical Conference, at the headquarters of Air Force Systems Command.

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5. Tripartite Technical Cooperation Program

A meeting of Panel N-1 of the Tripartite Technical Cooperation Program (TTCP) was held at the Armed Forces Radiobiology Research Institute on 14 and 15 March 1963. A meeting of Panel N-2, Sub Group N, of the TTCP was held in London 18-27 March 1963.

The Nuclear Weapons Effects Research (NWER) Subpanel on Radiation Response met at Headquarters, DASA, on 17 July 1963 to

*ACLANT - Allied Countries, Atlantic.

33. This chapter, pages 3-10 (Section 3-1).

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review radiation response research proposals. The NWER Subpanel on Thermal Effects met for the same purpose on 23 and 24 July 1963.

On 12 and 13 August 1963 the Nuclear Weapons Effects Research Biomedical Project Advisory Group met at DASA headquarters to review the fiscal year 1965 program for biomedical research in the area of nuclear weapons effects.

During the period 15-24 October 1963 Colonel Holmes and Lieutenant Colonel Mullins attended the Panel M-1 (Biomedical), and the Sub-Group M, Tripartite Technical Cooperation Program meetings in London, England. Lieutenant Colonel Mullins served as secretary at the meetings. He then proceeded to the St. Louis Institute, St. Louis, France, and to the University of Freiburg, Freiburg, Germany, to observe blast and shock research at both centers and radiation research activities at the University of Freiburg. These observations were made during the period 25-31 October 1963.

Key Personnel, 1963

Officers who reported to the Biomedical Division during the year 1963 were Captain Lorrain E. Watters, Jr., MC, USN, 3 July; and Commander Robert L. Gade, MSC, USN, 21 January; Major John L. Terry, VC, USAF, and Captain Emery B. Busch, Jr., MSC, USAF.

Officers who departed from the Division were: Major de Paul J. Corkhill, USAF, 28 June 1963; Lieutenant Commander Thomas S. Dunn, Jr., MC, USN, 15 July 1963; and Lieutenant Colonel William S. Mullins, MSC, USA, 24 December 1963.

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As of 31 December 1963 the key personnel of the Biomedical Division were organized as follows:

Surgeon and Chief, Biomedical Division

Colonel Robert H. Holmes, MC, USA

Deputy Surgeon

Captain Lorrain E. Watters, Jr., MC, USN

Executive Officer

Captain Emery B. Busch, Jr., MSC, USAF

Senior Project Officer

Lt. Colonel Max M. Nold, VC, USAF

Project Officers

Commander Robert L. Gade, MSC, USN

Lt. Commander Richard M. Garver, MSC, USN

Major John L. Terry, VC, USAF

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- 1964 -

Organization and Functions

The general internal organization of the Biomedical Division remained unchanged during the year 1964. Although in December 1964 the Division was redesignated the Medical Division, it will be referred to as the Biomedical Division throughout the year in this historical account.

Under the new DASA charter of 22 July 1964, the functions of the Biomedical Division were prescribed as follows:

In the Biomedical field of nuclear weapons effects:

1. Formulates broad nuclear weapons effects research and test objectives based upon DOD requirements for effects information.
2. Defends research and test objectives to JCS, DDR&E, and Secretary of Defense in order to obtain DOD approval.
3. Formulates integrated technical programs of applied research and nuclear tests to satisfy the approved objectives.
4. Supervises execution of the approved DOD research and test programs.
5. Collects, reviews, evaluates and disseminates information resulting from nuclear weapons effects research and tests.
6. Acts in a consultative capacity to organizations within the DOD and other government agencies.
7. Serves as the DASA Surgeon. The Surgeon shall advise the Director, DASA, and appropriate members of his staff on matters pertaining to:
 - a. The general health of DASA personnel.

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b. The budgeting for and operation of the medical facilities within the DASA.

c. Hazards assessment associated with the design, fabrication, modification, storage, handling, transportation, testing and employment of nuclear weapons.

d. Medical aspects of nuclear incidents and accidents occurring within the DASA.

e. Mass personnel casualty prediction.

f. Technical matters of the AFTRI.

g. The training of medical and paramedical officers of the Armed Forces in effects of Nuclear Weapons and Radiation biology.

8. The Surgeon serves as the DOD Representative on the Federal Radiation Council Working Group and as the U. S. National Leader on Biomedical Panel of the Tripartite Technical Cooperation Program.³⁴

Activities, 1964

1. Research Projects³⁵

During the year 1964 the Office of the Surgeon and the Biomedical Division continued to monitor DASA-sponsored research programs at a number of private as well as government institutions.

a. Hahnemann Medical College. On 2 January 1964 a modification was made in the contract with Hahnemann Medical College, Philadelphia, in connection with a study on "Biochemical Effects

34. Joint Table of Distribution [containing Functional Statements], Headquarters, Defense Atomic Support Agency, 1 July 1964.

35. This section, pages 31-37.

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of Thermal Stress. The modification provided for an additional 12-month period for the contract, ending 30 September 1964, at a cost of an additional \$15,000.

b. Columbia University. A contract with Columbia University for research on "Immunological and Toxic Factors in Thermal Injuries" was negotiated for a 12-month period beginning 1 February 1964, at a cost of \$35,000.

c. The Lovelace Foundation. In February 1964 a modification was requested in the contract with The Lovelace Foundation, Albuquerque, New Mexico, for research in "Biological Effects of Blast and Shock." This modification was for funding the participation of the Foundation in the biological research portion of Operation SNOW BALL at an additional cost of \$10,000.

On 10 September 1964 the Contract Management Branch, Logistics Division, Headquarters, DASA, was requested to negotiate a contract with The Lovelace Foundation for research in "The Biological Aspects of Integrated Effects," at an estimated cost of \$150,000.

On 13 October it was requested that a contract be negotiated with The Lovelace Foundation for research in "The Biological Effects of Blast from Bombs." The estimated cost of this contract was \$375,000.

d. Suffield Experimental Station. On 28 February 1964 the sum of \$100,000 in SNOW BALL funds was requested for transferal to the Suffield Experimental Station, Alberta, Canada, to pay for

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field tests in the Biological portion of Operation SNOW BALL.

On 11 June 1964 the Commanding General, Fort Lewis, Washington, was informed that a MIPR in the amount of \$3,200 was being forwarded to cover the round-trip costs of shipping two Army Field Ambulances from Fort Lewis to Suffield Experimental Station and to provide operational and maintenance expenses associated with use of the ambulances to provide medical support for Operation SNOW BALL.

e. Naval Radiological Defense Laboratory; Naval Applied Science Laboratory; Bureau of Naval Weapons; Naval Air Development Center; Bureau of Medicine and Surgery. A military interdepartmental purchase request (MIPR) was amended on 4 March 1964 to provide an additional \$10,000 of FY 1964 funds to the Naval Radiological Defense Laboratory in support of research on 'Effects of Protracted Radiation on Mammalian Systems.' This increase was to enable an earlier beginning in the project.

On 17 July 1964, MIPRs in the total amount of \$743,000 were forwarded to the Naval Applied Science Laboratory, Bureau of Naval Weapons, Naval Air Development Center, Naval Radiological Defense Laboratory, and the Bureau of Medicine and Surgery in support of Navy-managed biomedical research for HWER projects.

f. University of Cincinnati College of Medicine. It was requested on 24 March 1964 that a contract be negotiated with the University of Cincinnati College of Medicine, for research in Whole

16. This chapter, Section -B, page 43.

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body Radiation." The amount of this contract was \$40,000.

g. Medical College of Virginia. In April 1964 a modification was requested in the contract with the Medical College of Virginia, Richmond, Virginia, for research in "Immunological Factors in Burns. This modification, effective for a 12-month period beginning 1 December 1963, restored to this research project an amount of \$15,000 by which it had been reduced.

On 30 October 1964 the Contract Management Branch was requested to negotiate a new contract with the Medical College of Virginia, at an estimated cost of \$60,000 for continued research in "Immunological Factors in Burns."

In another contract with the Medical College of Virginia, Biophysics of Chorioretinal Burns and Flashblindness, it was requested, in May 1964, that a contract modification be made to reflect a change in the technical scope of the project at an estimated cost of \$55,000.

h. Air Force Systems Command. On 8 April 1964, Headquarters, Air Force Systems Command, Andrews Air Force Base, Maryland, was informed that a MIPR in the amount of \$8,000 was being forwarded to cover the cost of Air Force veterinary personnel being furnished for assistance in the biological research portion of Operation SNOW BALL. On 15 May an additional sum of \$1,200 was forwarded for the services of two more veterinary officers made available for a 15-day period in support of the biomedical research portion of SNOW BALL.

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1. Army Ballistic Research Laboratory. The Army Ballistic Research Laboratory, Aberdeen Proving Ground, Maryland, was informed in April 1964 that the amount of \$20,000 was being transferred to it by MILPR, in payment for instrumentation required for performing air-blast-pressure measurements for Operation SNOW BALL.

2. Surgeon General, Department of the Army. On 4 June 1964 the Surgeon General, Department of the Army, was informed that a sum of \$3,500 was being forwarded to cover the cost of travel and per diem for Army personnel who had been selected to provide medical support for Operation SNOW BALL.

On 17 July 1964 a MILPR in the amount of \$525,000 was sent to the Surgeon General, Department of the Army, in support of Army-managed biomedical MILPR projects.

3. National Naval Medical Center. The Commanding Officer, National Naval Medical Center, Bethesda, Maryland, was advised on 12 June 1964 that additional funds in the amount of \$174,115 were being provided in continued DASA support for research at the Armed Forces Radiobiology Research Institute (AFRRI).

On 6 July 1964 the Commanding Officer, National Naval Medical Center, was informed that DASA had agreed to participate jointly with the Atomic Energy Commission in the BREN II Studies.³⁷ He was further informed that a MILPR in the amount of \$50,000 was being forwarded to enable the AFRRI to obtain equipment for

37. This chapter, Section 4-3, page 32.

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participation in performing neutron depth dose, distribution, and other experiments as part of the BREN II Studies.

On 3 August 1964, the Commanding Officer, National Naval Medical Center, was informed that by NIEPR the amount of \$750,000 would be provided in financial support of research by AFTRI entitled 'Nuclear Reactor Biological Studies'; an additional \$750,000 was being held by Headquarters, DASA, for future research along the same line.

1. National Bureau of Standards. In June 1964, the National Bureau of Standards was advised that funds in the amount of \$213,400 would be paid to it for providing the AFTRI with a scientific data systems computer (Type 920) and its normal accessories, on a one-year lease with option to purchase.

2. Air Force-Managed NIEPR Projects. On 17 July 1964 a NIEPR in the amount of \$520,000 was sent to Headquarters, United States Air Force, in support of Air Force-managed biomedical NIEPR projects.

3. Radiation Research Associates. In July 1964 the Contract Management Branch was requested to negotiate a contract modification with Radiation Research Associates, Incorporated, for the publication of additional data and information on the LO 5 Monte Carlo Program and on Fallout and Point Co⁶⁰ Source Calculations. This additional work was to be accomplished at a cost of \$1,250.

4. Atomic Energy Commission. On 31 July 1964 the New York Operations Office of the Atomic Energy Commission was notified that

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an Interagency cost reimbursement order in the amount of \$34,300 could be forwarded in support of AEC research in "Partial Body Irradiation."

3. Contracts for Armed Forces Radiobiology Research Institute (AFRRI). The Contract Management Branch was requested, on 5 August 1964, to negotiate, for AFRRI, a contract with General Atomic, Division of General Dynamics, San Diego, California. At an estimated cost of \$60,000, this contract would require that General Atomic "measure and calculate fast leakage spectra from the AFRRI TRIGA Core" and furnish AFRRI the information obtained.

On 12 August the Contract Management Branch was requested to negotiate a contract, for AFRRI, with William M. Trebeck and Associates, Berkeley, California, for a feasibility study by the latter on the AFRRI Positive Ion Accelerator. The estimated cost of this study was \$28,000.

On 29 September 1964 the Contract Management Branch was requested to negotiate a contract with General Atomic, Division of General Dynamics, for services to AFRRI. The cost of this contract, which would define military radiobiology problem areas, was estimated at \$15,325.

4. Armed Forces Institute of Pathology. In August 1964 a check in the amount of \$30,000 was sent to the Director, Armed Forces Institute of Pathology. This amount was to provide \$15,000 each in support of research on "Early Lymphocyte Changes" and "Early Cellular Titles."

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r. Bureau of Naval Weapons. On 11 August 1964, the Chief, Bureau of Naval Weapons, Department of the Navy, was advised that additional funds in the amount of \$300,000 were being made available in support of research entitled "Medical Aspects of Thermal Injury, Oculo-Visual Effects."

s. Bureau of Ships. The Chief, Bureau of Ships, Department of the Navy, was informed, on 2 September 1964, that an additional amount of \$50,000 would be made available in support of research on "Thermal Injury Caused by Nuclear Warheads."

t. Minnesota Mining and Manufacturing Company. On 16 September 1964 a program amendment notice was sent to the DASA Comptroller, advising that \$4,303.64 from a research contract entitled "Metabolism of Fission Products from Fallout," and \$2,415.81 from a research contract entitled "Study of Radiation Injury," making a total of \$6,719.45, were to be transferred to the AFTRI contract with the Minnesota Mining and Manufacturing Company, entitled "Nuclear Reactor Biological Studies."

The Chief, Contract Management Branch, Headquarters, DASA, was requested, on 18 November 1964, to make a contract settlement with the Minnesota Mining and Manufacturing Company for increased costs incurred by a change in the scope of its contract for a "Feasibility Study for a High Fidelity Fallout Simulator" for the AFTRI. The settlement was to be at an additional cost of \$9,003.

u. Cornell University. The Contract Management Branch was requested, on 25 September 1964, to negotiate a contract with

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Cornell University for continued research entitled "Biomedical Dosimetry and Response to Internal and External Radiation." The estimated cost of this contract was \$91,000.

v. New York University. On 5 October 1964, the Contract Management Branch was requested to negotiate a contract modification with New York University in support of research entitled "Short Lived Fission Products in Food Chain and Man." The estimate of this contract modification was \$42,000.

w. National Lead Company. On 30 November 1964 it was requested that the Contract Management Branch negotiate a contract with the National Lead Company, Washington, D. C., for the disposal of reactor fuel elements no longer serviceable for AFRRI. The estimated cost of this contract was \$16,362.

x. David Taylor Model Basin. The Commanding Officer and Director, David Taylor Model Basin, near Washington, D. C., was advised by letter dated 23 October 1964 that a MIPR in the amount of \$46,000 would be advanced in support of "Biomedical Research in Operation SAILOR HAT."³⁸

In a program amendment action, the Comptroller was requested to transfer the amount of \$46,000 from "Biomedical Portion of Operation SNOW BALL" to "Biomedical Research in Operation SAILOR HAT."

39. This chapter, Section 5-2, page 34.

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2. Other Activities

The DASA Surgeon and the respective members of the Biomedical Division, in addition to monitoring INWER research, as outlined above, attended numerous meetings concerned with nuclear medical and biomedical effects, gave briefings and lectures to groups interested in similar and related fields, and took part in field operations in which the Division was concerned, notably SNOW BALL.

During the period 1 through 28 July 1964 representatives of the Division were on temporary duty at the Suffield Experimental Station, Alberta, Canada, in connection with Program 4 (biomedical) of Operation SNOW BALL.

From 21 September through 3 October 1964 and from 7 through 11 December a representative of the Division participated in a conference at Aldermaston, England, in connection with data from Project ROLLER COASTER.³⁹

Late in September 1964 a group from the Biomedical Division attended the meeting in Toronto, Canada, of Panel N-1 (Biomedical) of Sub-group N, Tripartite Technical Cooperation Program.⁴⁰

39. This chapter, Section S-3, page 31.

40. This chapter, pages 8-10.

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3. Armed Forces Radiobiology Research Institute (AFRRI)⁴¹

By authority contained in a Department of Defense Directive dated 22 July 1964, the Defense Atomic Support Agency (DASA) assumed command and administrative control of the Armed Forces Radiobiology Research Institute (AFRRI).⁴² The history of the AFRRI is contained in a separate report.

4. Liaison

Continued liaison was maintained with the following:

- a. The Deputy Assistant Secretary of Defense (Health and Medical).
- b. The Surgeon General, Department of the Army.
- c. The Bureau of Medicine and Surgery, Department of the Army.
- d. The Office of the Surgeon General, Department of the Air Force.
- e. Walter Reed Army Institute of Research.
- f. The Air Force School of Aviation Medicine.
- g. The Division of Biology and Medicine, AEC.
- h. The Division of Operational Safety, AEC.
- i. Armed Forces Institute of Pathology.
- j. Armed Forces Radiobiology Research Institute.
- k. Office of Civil Defense.

41. This section, pages 46-57, 57.

42. General Order Number 19, HQ, DASA, 1 September 1964.

1. The Federal Radiation Council.

m. The Department of Health, Education, and Welfare.

Key Personnel, 1964

Officers who reported to the Biomedical Division during the year 1964 were: Colonel Gerrit L. Hekhuis, USAF, MC, on 6 April 1964; and Major John D. Mosely, USAF, VC, on 17 September 1964.

Officers who were detached were: Colonel Robert H. Holmes, MC, USA, on 12 June 1964; and Lieutenant Colonel Max M. Mold, USAF, VC, on 6 July 1964.

As of 31 December 1964 the key personnel of the Division were as follows:

Surgeon and Chief, Biomedical Division

Colonel Gerrit L. Hekhuis, USAF, MC

Deputy Surgeon and Assistant Chief

Captain Lorrain E. Watters, Jr., MC, USN

Program Coordinator

Major Emory B. Busch, Jr., USAF, MSC

Project Officers

Commander Robert L. Gade, MSC, USN

LCDR Richard M. Garver, MSC, USN

Major John L. Terry, Jr., USAF, VC

Major John D. Mosely, USAF, VC

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- 1965 -

Organization and Functions

Although the functions of the Medical Division remained as outlined under the DASA charter of July 1964, the organization of the Division in the year 1965 was into branches, with individual assignments as projects officers. This will be shown in the list of key personnel.⁴³

Activities, 1965

1. Research Projects⁴⁴

The Medical Division continued to monitor research projects at both public and private institutions. Contracts were made, modified, or renewed in connection with the following:

<u>Agency</u>	<u>Research Topic</u>	<u>Date</u>
American Electronic Laboratories, Inc.	"Radiation Hardened EKG Telemetry System"	18 June 1965
Armed Forces Institute of Pathology	"Early Lymphocyte Changes" (Subtask 03.101)	19 August 1965
	"Early Cellular Changes" (Subtask 03.102)	
Arthur D. Little, Inc.	Reference Service for AFMRI	18 June 1965
Biodynamics, Inc.	"Review of Research on Flashblindness"	9 March 1965

43. This section, pages 62 and 63.

44. Ibid., pages 44-52.

<u>Agency</u>	<u>Research Topic</u>	<u>Date</u>
Biotechnology, Inc.	"Solar Thermal Measurements for Use in Flashblindness Studies (Subtask 03.133)"	12 March 1965
Columbia University	(Contract extension) (DA-49-146-XZ-068)	29 July 1965
Cornell University	"Biological Response to Ionizing Radiation"	16 September 1965
Edgerton, Germeshausen and Grier, Inc.	Radar for AFRRI	30 March 1965
Foringer and Company, Inc.	"Programming Proposal for Behavioral System" (Subtask 03.064)	
	"Proposal for the Physiological System"	10 March 1965
General Atomic Division of General Dynamics Corporation	Additional support for AFRRI	30 April 1965
General Electric	"The Development of Optical/Thermal Energy Recording Instrument (Subtask 04.502T)"	22 June 1965
Hahnemann Medical College	Contract Modifications (Subtask 03.034)	9 March 1965 27 May 1965
Louisiana State University	"Development of Activation Analysis Methodology and Applications in Military Radiobiology"	14 June 1965
Lovelace Foundation	"Integrated Effects of Nuclear Weapons"	7 December 1965
Massey Dickinson Company, Inc.	"Data Acquisition and Programming Proposal" (Subtask 03.064)	10 March 1965

<u>Agency</u>	<u>Research Topic</u>	<u>Date</u>
Medical College of Virginia	"Biophysics of Chorioretinal Burns and Flashblindness" (Subtask 03.002) Modification	2 February 1965 13 September 1965
	Mortality Prediction Equation	2 March 1965
	"Prediction of Mortality Following Thermal Injury"	20 September 1965
	Modification in support of Subtask 03.033	16 December 1965
National Lead Company	Disposal of DASA TRIGA Reactor Fuel Elements	25 February 1965
Polaroid Corporation	"Research Studies of the Pupillary Mechanism" (Subtask 03.149)	28 July 1965
Technology, Inc.	"Radiation Damage Determination by Electrical Impedance Measurement" (Subtask 03.139)	24 June 1965
United States Air Force		
Air Force Research and Development	"Visual Decrement Following Thermal Injury to the Retina" (Subtask 03.137)	10 May 1965
	"Approximation Model for Prediction of Retinal Burns" (Subtask 03.138)	10 May 1965
	Construction of Large Animal Irradiation Facility (Subtask 03.030)	21 May 1965
Air Force Weapons Laboratory	Support of Blue Rock Project 4.1	4 February 1965
	"Comparative Toxicity of Plutonium Isotopes" (Subtask 03.128)	7 April 1965

<u>Agency</u>	<u>Research Topic</u>	<u>Date</u>
United States Army Medical Research and Development Command	Modification Increase (Subtask 03.077) (Subtask 03.105)	19 August 1965
	"Effectiveness of Mixed Radiation Exposures" (Subtask 03.085)	13 October 1965
Surgeon General	Support of NWER Projects	1 Jul 1965
United States Navy		
Aviation Medical Acceleration Laboratory	Subtask 04.503T	9 August 1965
Bureau of Medicine and Surgery	"Variations in Body Fluids Following Exposure to Ionizing Radiation" (Subtask 03.150)	13 August 1965
David Taylor Model Basin	Operation SAILOR HAT (Subtask 03.131)	12 April 1965
National Naval Medical Center	Funding of AFRRRI Administrative Support	27 April 1965
Naval Applied Science Laboratory	"Solar Thermal Measurements for Use in Flashblindness Studies" (Subtask 03.133)	30 March 1965
Naval Medical Research Institute	"Oculo-Thermal Injury" (Subtask 03.124)	28 October 1965
University of California	"Physiological Effect of Photostress upon Retinal Function"	9 March 1965
University of Cincinnati	"Metabolic Changes in Humans Following Total Body Irradia- tion" (Subtask 03.009)	16 June 1965
University of Rochester	"Partial Body X-radiation" (Subtask 03.050)	16 July 1965
Varian Associates	Long Pulse Linear Accelerator Study for AFRRRI	13 May 1965

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2. Nuclear Weapons Effects Research
Medical Advisory Group

The first meeting of the Nuclear Weapons Effects Research Medical Advisory Group met in DASA headquarters on 3, 4, and 7 June 1965. This group was a DOD-approved body of eminently qualified scientific personnel, some civilian and some military, appointed to serve in an advisory capacity in connection with the Nuclear Weapons Effects Research (NWER) projects monitored by the Medical Division.

3. Other Activities

In January 1965 a long-range planning conference for nuclear weapons effects research (NWER) was held by the Medical Division in DASA headquarters. Representatives of the Army, Navy, and Air Force were in attendance.

On 3 March 1965 a conference on the subject "Collation of Dosimetry of Military Personnel in Nuclear Testing Operations," sponsored by the Medical Division, was held in DASA headquarters. Attending were representatives of the three Services and the Armed Forces Institute of Pathology.

During the period 15 through 18 June a representative of the Medical Division attended the first Annual Biomedical LASER Conference. This meeting was held in Boston, Massachusetts.

Officers of the Medical Division made numerous trips and visits in connection with monitoring the research projects (listed above) and in connection with tests, test results, planning conferences, and other concerns of the Division.

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4. Sandia Base Hospital Project

On 12-14 September 1965, Colonel Mekinis and Major Busch visited the hospital at Sandia Base, New Mexico, in connection with the proposed project for an addition to and alteration of the hospital facilities there.

On 23 September 1965 Major Busch, representing the Medical Division, and Mr. Taton, representing the Logistics Division, Headquarters, DASA, attended a meeting of the Hospital Planning Group of the Office of the Secretary of Defense, in the Pentagon. At this meeting the Sandia Base Hospital Project was described to the group, and verbal approval was obtained for its inclusion in the recommended construction program for fiscal year 1968.

5. Liaison

The Medical Division continued liaison with those offices and agencies with which it had previously been maintained and with others, as shown in the following list.

- a. The Deputy Assistant Secretary of Defense (Health and Medical).
- b. The Surgeon General, Department of the Army.
- c. The Bureau of Medicine and Surgery, Department of the Navy.
- d. The Office of the Surgeon General, Department of the Air Force.
- e. Walter Reed Army Institute of Research.

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f. The Air Force School of Aerospace (formerly Aviation) Medicine.

- g. The Division of Biology and Medicine, AEC.
- h. The Division of Operational Safety, AEC.
- i. Armed Forces Institute of Pathology.
- j. Armed Forces Radiobiology Research Institute.
- k. Office of Civil Defense.
- l. The Federal Radiation Council.
- m. The Department of Health, Education, and Welfare.
- n. Director of Defense Research and Engineering.

Key Personnel, 1965

Captain Lorrain Watters, MC, USN, Deputy Surgeon, DASA, was detached from the Agency on 12 July 1965. Commander Robert L. Gade, MSC, USN, was detached also on 12 July 1965.

Officers who reported for duty with the Medical Division were Commander George P. Douglas, USN, on 1 July 1965; Lieutenant Colonel Edmund L. Fountain, USA, on 12 July 1965; Major Edward W. Blackburn, USA, on 15 July 1965; and Lieutenant Commander Robert E. Grunawalt, USN, on 1 December 1965. The latter was assigned as Deputy Surgeon, DASA.

As of 31 December 1965 the key personnel of the Medical Division were organized as follows:

Surgeon and Chief, Medical Division

Colonel Gerrit L. Hekhuis, USAF, MC

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Deputy Surgeon

LCDR Robert E. Grunawalt, MC, USN

Program Coordinator

Major Emery B. Busch, Jr., USAF, MSC

Medical Effects Branch

Lt. Colonel Edmund L. Fountain, VC, USA

CDR George P. Douglas, MSC, USN

LCDR Richard M. Garver, MSC, USN

Major John L. Terry, Jr., USAF, VC

Medical Application Branch

LCDR Robert E. Grunawalt, MC, USN

Major John D. Mosely, USAF, VC

Major Edward W. Blackburn, MSC, USA

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- 1966 -

Organization and Functions

The organization and functions of the Medical Division did not change during the year 1966.

Activities, 1966

1. Research Projects

The Medical Division continued in its monitoring of research projects at both public and private institutions.⁴⁵

Contracts were made, modified, or renewed, as follows:

<u>Agency</u>	<u>Research Topic or NWER Subtask</u>	<u>Date</u>
Armed Forces Institute of Pathology	Subtasks 03.101 and 03.102	18 July 1966
Cornell University	Research on Neuro- psychological Response to Radiation (Subtask 03.049)	4 November 1966
General Electric	Development of an Optical/ Thermal Energy Recording Instrument (Subtask 04.504T)	16 May 1966
Johns Hopkins University	"Radiation Infection and Inflammation" (Subtask 03.157)	6 June 1966

45. This section, pages 56-59.

*NWER - Nuclear Weapons Effects Research.

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<u>Agency</u>	<u>Research Topic or NWER Subtask</u>	<u>Date</u>
Lovelace Foundation	"The Biological Effects of Hlast from Bombs"	25 January 1966
	Subtask 03.012	8 February 1966
Medical College of South Carolina	Investigation of Burn Injuries (Subtask 03.033)	17 June 1966
Medical College of Virginia	Subtask 03.008 Subtask 03.033	28 March 1966
Polaroid Corporation	Research on Eye Protection (Subtask 03.419)	3 August 1966
Southwest Research Institute	"A Low Field Electron Spin Resonance Study of the Effects of Ionizing Radiation in Living Animals" (Subtask 03.156)	17 May 1966
United States Air Force		
Air Force Weapons Laboratory	Test Instrumentation Development (Subtask 04.505T)	2 June 1966
Radiological Health Laboratory, Wright- Patterson AFB	Data Reduction of Radiological Aspects of Health Records	13 July 1966
United States Army		
U. S. Army Medical Research and Development Command	Subtask 03.105 "Functional Effects of Ionizing Radiation on the Central Nervous System in Man" (Subtask 03.153)	27 January 1966 28 March 1966
Army-managed NWER Projects	Subtasks 03.008 03.074 03.085	18 July 1966

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<u>Agency</u>	<u>Research Topic or NWER Subtask</u>	<u>Date</u>
United States Navy		
Aviation Medical Acceleration Laboratory	Flight Testing of Instrumentation for BLUE ROCK	7 March 1966
	Subtask 03.154	13 May 1966
Naval Air Development Center	Navy-managed NWER Projects	
Naval Air Systems Command		18 July 1966
Naval Applied Science Laboratory		and
Naval Medical Research Institute		23 November 1966
Naval Radiological Defense Laboratory		
University of California	Subtask 03.013	6 June 1966
University of Cincinnati College of Medicine	Subtask 03.009	19 May 1966
University of Miami (Florida)	"The Physiological Effect of Photostress upon Retinal Function" (Subtask 03.013)	16 December 1966

2. Nuclear Weapons Effects Research
Medical Advisory Group

During the period 20-24 June, the Medical Division was host,
in DASA headquarters, to the NWER Medical Advisory Group.⁴⁶

46. This section, page 60.

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3. Liaison with Other Organizations

Continuous liaison was maintained with the following agencies and offices:

- a. The Deputy Assistant Secretary of Defense (Health and Medical).
- b. The Surgeon General, Department of the Army.
- c. The Bureau of Medicine and Surgery, Department of the Navy.
- d. The Office of the Surgeon General, Department of the Air Force.
- e. Walter Reed Army Institute of Research.
- f. The Air Force School of Aerospace (formerly Aviation) Medicine.
- g. The Division of Biology and Medicine, AEC.
- h. The Division of Operational Safety, AEC.
- i. Armed Forces Institute of Pathology.
- j. Armed Forces Radiobiology Research Institute.
- k. Office of Civil Defense.
- l. The Federal Radiation Council.
- m. The Department of Health, Education, and Welfare.
- n. Director of Defense Research and Engineering.
- o. The United States Air Force Director of Science and Technology.

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Close liaison was maintained with the Armed Forces Radiobiology Research Institute (AFRRI), a part of the Defense Atomic Support Agency organization.

Key Personnel, 1966

Officers who were detached from the Division and from DASA during the year 1966 were Lieutenant Colonel John L. Terry, Jr., USAF, VC, on 10 June; Lieutenant Commander Richard M. Carver, MSC, USN, on 1 July; and Colonel Gerrit L. Makdisis, USAF, MC, on 1 November.

Reporting for duty during the year 1966 were Major William R. Godden, USAF, VC, on 11 July; Lieutenant Larry W. Hill, MC, USN, on 25 July; Lieutenant Commander William H. Kolb, MC, USN, on 29 July; and Lieutenant Colonel Hugh B. Mitchell, USAF, MC, on 1 November.

As of 31 December 1966 the key personnel of the Medical Division were organized as follows:

Surgeon and Chief, Medical Division

Lt. Colonel Hugh B. Mitchell, USAF, MC

Deputy Surgeon

LCDR Robert E. Grunsalt, MC, USN

Administrative Officer

Major Harry B. Busch, Jr., USAF, MSC

Medical Effects Branch

Lt. Colonel Edmund L. Fountain, VC, USA

CDR George P. Douglas, MSC, USN

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Lt. Colonel John D. Mosely, USAF, VC

Major Edward W. Blackburn, MSC, USA

Major William R. Godden, USAF, VC

LCDR William R. Kolb, MC, USN

Medical Application Branch

LCDR Robert E. Grunewalt, MC, USN

LT Larry W. Hill, MC, USN

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- 1967 -

Organization and Functions

In common with other organizational elements of Headquarters, DASA, what had been the Medical Division and its respective branches underwent a change in nomenclature as of 1 March 1967. The Medical Division became the Medical Directorate, while its former branches became divisions.⁴⁷ These were the Medical Applications Division and the Medical Effects Division. The functions of the organizational elements remained basically as they had been.

Activities, 1967

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1. Research Projects

The Directorate monitored research projects at both public and private institutions. In addition to the checking on the progress of projects already contracted for and the renewal and modification of many such contracts in the form of additional monetary support, military interdepartmental procurement requests (MIPRs) were forwarded in September 1967 to the respective Departments of the Army, the Navy, and the Air Force, for support of Nuclear Weapons Effects Research (NWER), as follows:

47. General Order Number 13, Hq., DASA, 27 February 1967.

48. This section, pages 64-66.

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<u>NWER Subtask</u>	<u>Military Agency</u>	<u>MIPR Amount</u>
<u>Department of Army:</u>		
RMD 1.153	Walter Reed	\$30,000
RMD 3.157	Office of Surgeon General (Johns Hopkins University)	\$30,000
<u>Department of Navy:</u>		
RMD 2.055	Naval Air Development Center	\$50,000
RMD 2.001	Naval Applied Science Laboratory	\$103,000
RMD 2.062	Naval Applied Science Laboratory	\$50,000
RMD 3.035	Naval Radiological Defense Laboratory	\$270,000
<u>Department of Air Force:</u>		
RMD 3.030	Air Force Weapons Laboratory	\$70,000
RMD 3.121	Air Force Weapons Laboratory	\$50,000
RMD 2.003	School of Aerospace Medicine	\$50,000
RMD 2.134	School of Aerospace Medicine	\$50,000
RMD 2.137	Aeromedical Research Laboratory	\$95,000

2. Special Conferences

Many conferences were attended by respective members of the staff of the Medical Directorate. A majority of the meetings were concerned with the research projects for which the Directorate was responsible. Certain meetings and conferences are worthy of special note, as shown in the paragraphs which follow.

The first of five conferences on "The Long-Range Biomedical and Psychological Effects of Nuclear War", sponsored by DASA and managed under the Interdisciplinary Communications Program of the

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New York Academy of Science, was held at Princeton, New Jersey, 18-21 January 1967. The subject of this conference was "The Long-Range Bio-medical and Psychological Effects of the Atomic Bomb Explosions over Hiroshima and Nagasaki".

The Medical Directorate was represented at a meeting of the Federal Radiation Council on 3 February 1967. Topics discussed were "Iodine (I^{131}) from Chinese Nuclear Tests", and "Control of Radiation Hazards in Uranium Mining". At a working-group meeting on 21 February, problems and programs under these two headings were discussed.

During the period 20-23 March 1967, a representative of the Directorate visited the United States Air Force School of Aerospace Medicine, at San Antonio, Texas. The purpose of this visit was to discuss with an AEC (Los Alamos) representative the most recent data on retinal burns, weapons output, and safety criteria for weapons testing.

The Medical Directorate was represented at Castle Air Force Base, 4 and 5 May 1967 at a demonstration of a B-52 simulator device for orientation training on flash-blindness.

During the period 15-19 May 1967 a representative of the Directorate visited the Northrup Space Laboratory (NSL) at Hawthorne, California, and the Long Beach Veterans' Administration Hospital, Long Beach, California. The purpose of the visit to the Space Laboratory was to monitor, coordinate, and participate in the reactor exposures of primates, under NWER Subtask O3.067, being performed by the School of Aerospace Medicine. The purpose of the

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visit to the Veterans' Administration Hospital was to discuss and clarify the research proposal from that institution entitled "Neuro-physiological and Behavioral Effects of Incidental Irradiation of Normal Humans".

On 16 June 1967 a representative of the Medical Directorate visited the David Sarnoff Research Laboratories, Radio Corporation of America, at Princeton, New Jersey, to review the progress and future plans of the contract under NWER Subtask O3.OO3, "Thermal Radiation Effects on the Eye and Eye Protection".

On 27 June 1967 a Medical Directorate representative met with representatives of both the Naval Air Development Center and the Air Force School of Aerospace Medicine to develop a coordinated and long-range research program on flashblindness.

3. Liaison with Other Organizations

Liaison was continued with those agencies and offices listed
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as of 1966.

Key Personnel, 1967

Officers who were detached during the year were: Lieutenant Colonel John D. Mosely, USAF, on 3 January; Major Emery B. Busch, Jr., USAF, on 19 June; Lieutenant Commander Robert E. Grunawalt, USN, on

49. Ibid., pages 67 and 68.

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14 July; Commander George P. Douglas, USN, on 31 July; Colonel Hugh B. Mitchell, USAF, on 1 August; and Lieutenant Larry W. Hill, USN, on 27 September.

Those who reported for duty with the Medical Directorate were: Lieutenant Colonel William C. Ross, USAF, on 23 July; Commander James W. Duckworth, USN, on 23 July; Captain James E. Stark, USN, on 1 August; and Lieutenant Robert L. Bonsanti, USN, on 19 October.

As of 31 December 1967 the key personnel of the Medical Directorate were organized as follows:

Surgeon and Chief, Medical Directorate

CAPT James E. Stark, MC, USN

Deputy Surgeon

LT Robert L. Bonsanti, MC, USN

Administrative Officers

Lt. Colonel William C. Ross, MSC, USAF

Medical Effects Division

Lt. Colonel Edmund L. Fountain, VC, USA

Lt. Colonel Edward W. Blackburn, MSC, USA

Lt. Colonel William R. Godden, VC, USAF

LCDR William H. Kolb, MSC, USN

Medical Application Division

CDR James W. Duckworth, MSC, USN

LT Robert L. Bonsanti, MC, USN

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- 1968 -

Organization and Functions

The Medical Directorate continued to be organized, as during 1967, in two divisions -- the Medical Effects Division and the Medical Applications Division. The functions also remained basically unchanged.

Activities, 1968

Medical Effects Division

The Medical Effects Division continued to coordinate, review, and supervise those programs under Nuclear Weapons Effects Research (NWER) and Nuclear Weapons Effects Tests (NWEF) which were applicable to the Medical Directorate. These programs were those which were designed to evaluate human response and vulnerability to the effects of nuclear weapons and to prevent, delay, or mitigate such response. They involved five major areas: (1) biomedical effects -- incapacitation, performance decrement, and combined injury; (2) biomedical effects -- ocular and thermal injury; (3) biomedical effects -- radiation injury; (4) biophysics of radiation injury; and (5) analysis and application of biomedical effects data. During the year 1968 the research in these areas progressed satisfactorily but

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at a reduced rate, as a result of a reduction in requested funding. In the period fiscal year 1967 to fiscal year 1969 the medical program was reduced by \$1,700,000, resulting in the termination of 14 research subtasks. The planned reduction in the fiscal year 1970 program was \$4,119,000.

The Medical Effects Division was represented in Operation PRAIRIE FLAT at Suffield Experimental Station, Alberta, Canada.⁵⁰ Personnel from the Division participated also in a planning conference for MIGHTY SKY.⁵¹

Medical Applications Division

In the general revision of EM-1 (formerly TM 23-200), "Capabilities of Nuclear Weapons" and "The Effects of Nuclear Weapons," the biological aspects were assigned to the Medical Applications Division.

TP 20-5 "Plutonium Contamination Standards," a Tri-Service, AEC, and DASA publication, was published in May 1968.

A report was compiled on biological comparisons among animal species in response to radiation, their similarity to man, and their suitability for laboratory use.

Information concerning the status of development of each unit in the biomedical NWER projects was brought up to date.

50. This chapter, Section 8-1A, pages 34-85.

51. Ibid., page 82.

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A DASA paper was compiled on radiation-induced incapacities and resultant performance.

Members of the division coordinated with the Atomic Energy Commission, the Office of the Secretary of Defense (Atomic Energy), and the Services in incorporating DOD plutonium-exposure records in the Plutonium Registry being established by the AEC at Hanford Health Foundation.

General

In addition to the particular duties and special projects of the respective divisions within the Medical Directorate, the members of each division participated in meetings and symposia. The Surgeon, DASA, in addition to his duties as head of the Medical Directorate, Headquarters, DASA, fulfilled the mission as Surgeon of the DASA Command.⁵²

Key Personnel, 1968

Key personnel who were detached from the Medical Directorate during the year 1968 were: Commander James W. Duckworth, MSC, USN; Lieutenant Colonel Edward W. Blackburn, MSC, USA; Lieutenant Colonel Edmund L. Fountain, VC, USA; and Lieutenant Robert L. Bonsanti, MC, USN.

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Organization and Functions

The Medical Directorate, under the organizational structure of the Deputy Director, Science and Technology, but under the immediate direction of the Surgeon, DASA, continued during the year 1969 with its organization and functions unchanged.

Activities, 1969

Medical Effects Division

The Medical Effects Division continued to manage a coordinated research program concerning the vulnerability and survivability of man in the environment of nuclear exposure, particularly in nuclear warfare. The project was designed to provide information of value to mission completion for strategic and tactical aircrews, to command post operations, and to combat effectiveness of ground forces. A major objective was to determine the effects of combined and cumulative exposures to nuclear radiation. Currently of prime concern was the prediction of the effects of ABM* on man. Research toward these ends was supported at the Armed Forces Radiobiology Research Institute (AFRRI), at several other DOD laboratories, at educational institutions, and in connection with some civilian contractors. Effects under study

* ABM = anti-ballistic missile.

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included those from blast as well as from thermal and radiation exposure resulting in skin burns, retinal burns, flash blindness, incapacitation, clinical illness, and death.

Two tables on radiation-induced performance loss and incapacitation which had been published in the Atomic Weapons Supplementary Development Report (HQ DASA 49) were brought up to date and were submitted for incorporation in the revision of that report. They were also incorporated in Effects Manual Number One (DASA-EM-1).

Studies were begun on multiple dose response in monkeys and miniature swine. Preliminary results indicated that the degree of performance loss following a second dose (the two doses separated by a 5 to 6-hour interval) was not as severe as that following the first dose. Two doses of 2500 rad each, separated by an interval of 40 minutes, seemed to produce, in the monkeys, the same result as one 5000-rad dose.

Shielding studies, also, were carried on, using monkeys, miniature swine, and beagle hounds as subjects. The response in the monkeys indicated that both head and trunk shielding tended to lessen the severity of performance loss, with head shielding considerably more effective than trunk shielding as a protective measure. Data from studies conducted with dogs and pigs also showed head shielding to be effective but did not show trunk shielding to be of significant value in these species.

[REDACTED]

The above-mentioned studies in radiation-induced performance loss or incapacitation showed that in such loss of ability there were complex changes in the nervous, cardiovascular, and pulmonary systems. Research was being carried on in DOD laboratories to determine the interrelationships of the physiological changes in these systems as the result of radiation exposure.

Since the current eye-burn study scale was inadequate for high-altitude predictions, a contract was negotiated for a new approach in this study, based on the temperature rise and heat conduction in the retina. This approach would provide safe observer-distance predictions for any type of source, including non-uniform fireballs at very high altitudes. Essential burn-threshold data were acquired from primates and from two human patients with retinal burns.

The DASA flash-blindness program was revised. In its initial stages was a contract for the development of a flash-blindness protective material.

Preliminary tests of potentially radioprotective drugs indicated that some drugs might be able to protect against the early transient incapacitation from high radiation doses. Other studies showed that the concentration of certain plasma proteins could be used to predict the inherent radiation sensitivity of animals. Such information could be useful in developing a sensitivity test for humans. A compilation of all available data on

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median lethal radiation dose determinations for various animal species was nearing completion as of the close of the year 1969 and would be useful in improving the median lethal dose estimates for man. Protection factors had been determined for some partial body-shielding configurations and were found to vary, depending on the radiation quality, body region, and total area shielded. Recovery from acute exposures were found to vary greatly among animal species. The recovery pattern for man was still to be determined. Recently acquired data indicated that an acute sub-lethal exposure would significantly reduce an animal's ability to tolerate exposure to a subsequent low dose rate.

Medical Applications Division

The Division continued to coordinate with the AEC in the establishment and organization of the National Plutonium Registry.⁵³

A major share of the efforts of the Division during the year 1969 was in the compilation of sections of Effects Manual Number One (DASA-EM-1). The final drafts of the sections on radiation and on burns were submitted to the contract editor (Lovelace Foundation) on 31 July and 7 November respectively.

53. This section, page 77.

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Health Education Program

The health education program for DASA personnel included: a lecture, demonstration, and instruction in "First Aid," to Civil Defense Personnel; films on "Drug Abuse" and "LSD"; and lectures and demonstrations on artificial respiration and on external heart massage for DASA personnel.

Schedules for free chest X rays and for free health-screening tests and Pap smears were distributed, and appointments were made for personnel desiring to take advantage of such tests. Pamphlets on narcotics and drug abuse, on smoking, and on heart disease were distributed. Information was distributed also on common poisonous plants as well as on poisons and counterdoses.

The blood donor program was continued, as was the opportunity for all personnel to receive influenza vaccine.

The Surgeon, DASA

In addition to his duties as head of the Medical Directorate, Headquarters, DASA, the Surgeon carried out his mission as Surgeon of the DASA Command.⁵⁴

⁵⁴. Chapter 15, Section 15-4, page 3.

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Key Personnel, 1969

Detached from DASA during the year 1969 were the following members of the Medical Directorate: Captain James E. Stark, MC, USN, 21 April; Lieutenant Stephen Kessler, MC, USN, 18 July; and Lieutenant Colonel William R. Godden, VC, USAF, 11 August.

Assigned to the Directorate during the year were: Colonel Edward J. Hrycke, MC, USA, 11 June; Lieutenant Warren O. Kessler, MC, USN, 21 July; and Major John W. Cable, VC, USAF, 3 September.

As of 31 December 1969 the key personnel of the Medical Directorate were organized as follows:

Surgeon and Chief, Medical Directorate

Colonel Edward J. Hrycke, MC, USA

Administrative Officer

Lt. Colonel William C. Ross, MSC, USAF

Medical Effects Division

Major Hal F. Stolz, VC, USA

Major James L. Murray, VC, USAF

Major John W. Cable, VC, USAF

Lt Herbert J. Mitchell, MSC, USN

Medical Applications Division

Colonel John A. Hilcken, USA

LCDR William H. Kolb, MSC, USN

Lt Warren O. Kessler, MC, USN

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Conclusion of this section of the History of the Defense Atomic Support Agency, 1959 through 1969.

Mary F. Shelley, Historian

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